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World's oceans could become "soupy swill": expert

B.C. not immune to algae bloom outbreaks

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Saltspring Island resident Sally Cole got home from a sailing trip in August looking forward to a hot shower. But when she turned on her taps, all she got was slime.

CREDIT:

A Chinese swimmer removes blue green algae from coastal waters in Qingdao, eastern China`s Shandong province, July 2, 2008. A little over a month before the start of the 2008 Olympic Games the venue for the sailing events in Qingdao was invaded by a forest of blue green algae.

"It was almost biblical. It was blood-red," says the Ganges resident. "I turned on the tap and it just flooped. Just a bit of viscous gloop came out. It was really horrible."

Otherwise, the taps were dry. "I thought it was a biological disaster or something infectious. We were really quite terrified."

The culprit was an algae bloom on Maxwell Lake that choked the water pipes of hundreds of residents. It took three days to clear it.

The experience made Cole realize how dependent we are on our fragile water systems.

"It was a real shock how fast our standard of living went down without water," she says.

The Saltspring incident is a local example of a global crisis in the Earth's lakes and oceans.

Our seas are suffocating under a layer of slime.

That slime - algae feasting on pollutants and fertilizers and starving the ocean of oxygen - is growing rapaciously and killing off sea life at an alarming rate.

These toxic "dead zones" have been spreading up the Pacific Northwest coast.

Since 2002, Oregon's waters have seen yearly species die-offs due to hypoxia (low-oxygen) and anoxia (no-oxygen) conditions from nutrients in currents and algae blooms.

A new study published in August reveals the world's dead zones have doubled in size every decade since 1960. Coastal waters with once rich

marine life - Chesapeake Bay, the Baltic Sea, the Black Sea and off Peru, Chile and Namibia - are rapidly losing species.

According to the report by two U.S. scientists, Spreading Dead Zones and Consequence for Marine Ecosystems, there are 405 asphyxiating dead zones in our oceans. At this rate, one B.C. scientist says, all that will be left for the next generation to harvest from the sea is "plankton soup."

The crisis is of our own making. The cause, predictably, is pollution. The culprits are fertilizer runoff in estuaries, sewage, global warming, overfishing and industrial waste.

Millions of tonnes of "nutrient pollution" - chemical fertilizer that adds phosphates and nitrogen to the water - feed algae blooms.

In the Gulf of Mexico, the shrimp- and crab-killing blooms are fed by 95,000 metric tonnes of nitrogen fertilizer that flows down the Mississippi River each year.

When the algae dies and sinks, it fuels a bacteria boom, which consumes oxygen and smothers life.

Deoxygenation can occur naturally in stagnant water. Some oceans, like the northern Indian Ocean, have lower oxygen levels because there's less wind to stir the water. But man has spread the disease.

Some zones are vast: the Baltic Sea's 70,000-square-kilometre aquatic graveyard is the largest on Earth. The Gulf of Mexico harbours North America's giant dead zone: a 22,000-sq-km sea morgue the size of New Jersey.

Other dead zones have been discovered off California, in Lake Erie, around the Florida Keys, in North and South Carolina creeks and in Washington's Puget Sound. Together, they have turned 246,048 sq km of the seas - an area the equivalent of all five of the Great Lakes - into marine wastelands.

Robert Diaz, a Virginia Institute of Marine Science professor and co-author of the dead-zone study, says the problem is already evident in Canadian waters.

In B.C., a dead zone was first spotted in the Saanich Inlet in 1960. Dead zones have been recorded in P.E.I. fish-farming bays in 2000 and in a 1,300-sq-km area in the St. Lawrence estuary, where oxygen levels have declined to nearly nil.

If fish swim into a dead zone, they often fall unconscious before they can escape. Shellfish and bottom-dwellers move too slowly to escape, leaving a stew of rotting marine life.

Even when fish survive in low-oxygen water, research shows their reproduction suffers, which could jeopardize wild fish stocks.

Diaz calls the trend a "widespread deleterious anthropogenic influence on . . . marine environments" that "rank[s] with overfishing, habitat loss and harmful algal blooms as major global environmental problems."

Pacific Northwest waters are faring poorly. Since 2002, the massive dead zone that's appeared every summer off Oregon's coast has crept south to California and north to Washington. In 2006, it reached 3,100 sq km, was

30 metres deep and lasted a record-breaking 17 weeks. (Global warming and winds that create upwellings of nutrients are thought to be culprits.)

North of Seattle, Washington's Padilla Bay succumbed to hypoxia in the 1990s and scientists found a 26-sq-km dead zone in Whidbey Basin and Skagit Bay, which empty into the Juan de Fuca Strait. In 2000, south Puget Sound
was found to have harboured a 34-sq-km dead zone.

Diaz says this could be catastrophic for our local marine life and aquaculture as "mass mortality of invertebrates and fishes is the first response to a new dead zone."

He states zones are likely to intensify here as their contributing factors, "algal blooms and intensive fish-farming, are problems that will continue into the future."

Already, the impact of ocean deterioration is being felt up and down the Pacific coast. Fishermen are bringing up cages of dead Dungeness crabs. Salmon researchers have found low oxygen from the Columbia River on Oregon border's to northern Washington.

As fish stocks fall, seabird populations are dying of starvation. On B.C.'s Triangle Island, the Cassins auklets are failing to breed. On the Washington and Oregon coasts, common murres and cormorants are dying in droves.

Deadly algaes are also becoming common on the Pacific West Coast. They have been blamed for the erratic behaviour and mass die-offs of sea mammals (some algaes act as neurotoxins and impair brain function).

Some 14,000 seals, sea lions and dolphins have washed up sick or dead in California in the last 10 years, and 650 grey whales have beached.

Deadly algaes have been a problem in the region since the 1980s, but scientists say they're increasingly frequent and intense.

In 2003, domoic acid-producing algae infected mussels in Port Townsend, Wash., 45 km from Victoria, forcing closure of shellfish beds.

In 2004, a toxic bloom 50 km wide was found off the northwest coast of Washington in the Juan de Fuca strait near Vancouver Island.

Here in B.C., red tides have been reported off the Sunshine Coast, algae blooms have been spotted off of Hornby Island and Campbell's-soup-can coloured gunk found washed up on Campbell River, Parksville and Nanaimo shores.

In 2006, there were 29 reported instances of paralytic shellfish poisoning caused by red tides. Vancouver Island was closed to shellfish harvesting from Victoria to Campbell River, through the Gulf Islands and Georgia Strait, one of the largest closures on record.

That same year, a massive algae bloom 15 km off the west coast of Vancouver Island grew so big it could be seen from space.

Golden algae fouled drinking water in Victoria twice that summer, giving it a fishy taste and smell. In the waters off the city, particularly around sewage outflows, oxygen depletion is already occurring, although strong tides have so far held off hypoxia.

In 2007, two blooms off the coast of Klemtu killed 260 tonnes of farmed salmon.

The crisis is not only local. Algae is storming international seas and claiming human victims.

Off Sweden, cyanobacteria blooms at times turn the Baltic Sea into a brown slush that makes residents' eyes burn. On Florida's Gulf Coast, toxic tides have killed hundreds of manatees and caused breathing problems for residents.

Algae has smothered 80 per cent of coral reefs in the Caribbean and ruined 75 per cent of California's fish-rich kelp forests. Poison day-glo-green caulerpa algae is killing fish off the coasts of 11 countries.

Off Spain, clots of jellyfish are so thick beaches need nets so swimmers don't get stung.

What will become of our oceans? One U.S. oceanographer has a succinct answer: slime.

Jeremy Jackson, a Scripps Institution of Oceanography professor, released a report in August warning of "mass extinction in the oceans" due to dead zones, global warming, overfishing, pollution, ocean acidification, ecosystem destruction and invasive species.

"Coastal ecosystems are endangered to critically endangered on a global scale," he states, and "unrestrained runoff of nutrients and toxins, coupled with rising temperatures, will increase the size and abundance of dead zones and toxic blooms that may merge along all continents."

What will remain, he contends, will be seas emptied of fish and filled with soupy swill - algae, bacteria and jellyfish and their ilk - the "rise of slime." This brave new ocean will resemble ancient oceans - a soup of primeval muck where "microbes and jellyfish . . . may constitute the only surviving commercial fishery" as the seas turn toxic.

Already, clouds of jellyfish are moving in - their numbers are up tenfold in the Bering Sea alone since 1990 - stinging fish schools to death and clogging machines.

In a worst-case scenario, Jackson believes, "even farmed seafood will be increasingly toxic . . . outbreaks of disease will increase . . . microbes will reign supreme."

University of B.C. Fisheries director Daniel Pauly believes that fish and seafood crisis has begun.

He says we've accepted a decline in the quality of fish we consume as the cod, tuna and salmon stocks collapse (this summer's Fraser River sockeye returns were the worst in 50 years).

We're eating bait and thinking it's normal. Case in point? Squid were never considered food until Mediterranean cuisines adapted to overfishing. Fake crab is not even real pollock but "surimi" - waste fibres washed off bones and made into paste.

"The fact that we eat that stuff instead of throwing it away indicates we're in the middle of that crisis. Demand is not met any more by the fish that we like. It's met with substitutes.

Farmed fish is substituted for real fish. The fish we're catching at 2,000 metres are substitutes for fish caught at 50 metres. We're already heavily into substitutes and people don't know that," Pauly says.

"If we have to have substitutes for the substitutes and substitutes for the substitutes' substitutes, when does it end?" he asks.

"It ends when we have nothing left."

The good news is dead zones are reversible. Cleanups have been successful in New York's Hudson and East rivers, England's Thames and San Francisco Bay.

When chemical fertilizers became too expensive for farmers after the Soviet Union collapse, the dead zone in the Black Sea, once 40,000 sq km, shrank dramatically from 1991 to 2001. But fertilizer use is again on the rise.

And globally only four per cent of dead zones are improving.

Changing the course, Pauly says, will take polluter-pay laws, fisheries restrictions, better fish-farming methods, changes in our diet and much better marine conservation.

It's a lot of work, but the alternatives aren't pretty. Just ask Sally Cole.

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